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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/032,478	01/02/2002	Sang-Young Kim	259/010 CIP	5586

7590 05/22/2002
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EXAMINER

NORRIS, JEREMY C

ART UNIT PAPER NUMBER

2827

DATE MAILED: 05/22/2002

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/032,478

Applicant(s)

KIM ET AL.

Examiner

Jeremy Norris

Art Unit

2827

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 02 January 2002.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-18 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-18 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 02 January 2002 is/are: a) ☐ accepted or b) ☒ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on _____ is: a) ☐ approved b) ☐ disapproved by the Examiner.
If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
* See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☒ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) 2.
- 4) ☐ Interview Summary (PTO-413) Paper No(s) _____.
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other:

DETAILED ACTION

Drawings

The drawings are objected to because the sectional views are not properly crosshatched (see MPEP 608.02). A proposed drawing correction or corrected drawings are required in reply to the Office action to avoid abandonment of the application. The objection to the drawings will not be held in abeyance.

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless --

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

Claims 1-7, 10-12, 16 and 17 are rejected under 35 U.S.C. 102(b) as being anticipated by US 5,767,580, granter to Rostoker (hereafter Rostoker).

Rostoker discloses, an array (only one shown) of resilient solder bonding structures, each one comprising a solder ball (700c) having a curved exterior surface enclosing a first volume and having an interior cavity (730) having a displacement constituting a second volume, the solder ball connecting at least one metal contact on a first surface (710c) to at least one metal contact on a second surface (750) [claim 1], wherein the second volume is not less than about 1 % of the first volume [claim 2], wherein the second volume is not more than about 90% of the first volume [claim 3].

Rostoker also discloses, a resilient ball grid array (BGA) electrical and mechanical attachment means for attaching an integrated circuit to a planar substrate,

comprising a plurality of solder ball structures (700c), each solder ball structure having a curved exterior surface enclosing a first volume and having an interior cavity (730) having a displacement constituting a second volume, each solder ball structure attaching one of a plurality of first metal contacts (710c) on the integrated circuit to an associated one of a plurality of second metal contacts on the planar substrate (750, see col. 4, lines 30-45) [claim 4], wherein the second volume is not less than about 1 % of the first volume [claim 5], wherein the second volume is not more than about 90% of the first volume [claim 6].

Moreover, Rostoker discloses a resilient ball grid array (BGA) electrical and mechanical attachment means for attaching an integrated circuit to a printed circuit board (see col. 4, lines 30-45), comprising a plurality of solder ball structures (700c), each solder ball structure having a curved exterior surface enclosing a first volume and having an interior cavity (730) having a displacement constituting a second volume, each solder ball structure attaching one of a plurality of first metal contacts (710c) on the integrated circuit to an associated one of a plurality of second metal contacts (750) on the printed circuit board [claim 7], wherein the second volume is not less than about 1 % of the first volume [claim 10], wherein the second volume is not more than about 90% of the first volume [claim 11].

In addition Rostoker discloses a resilient ball grid array (BGA) electrical and mechanical attachment means for attaching a first planar substrate to a second planar substrate (see col. 4, lines 30-45), comprising a plurality of solder ball structures (700c), each solder ball structure having a curved exterior surface enclosing a first volume and

having an interior cavity (730) having a displacement constituting a second volume, each solder ball structure attaching one of a plurality of first metal contacts (710c) on the first planar substrate to an associated one of a plurality of second metal contacts (750) on the second planar substrate [claim 12], wherein the second volume is not less than about 1 % of the first volume [claim 16] wherein the second volume is not more than about 90% of the first volume [claim 17].

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

Claims 8, 9, 13, 14, 15, and 18 rejected under 35 U.S.C. 103(a) as being unpatentable over Rostoker.

Rostoker discloses the claimed invention as described above except Rostoker is silent regarding the material of the two joined substrates. However, Rostoker does state that the substrates may comprise "chip, die, semiconductor package, circuit board, etc.". Examiner takes Official Notice that circuit boards may comprise both organic materials (e.g. FR-4) and inorganic materials (e.g. ceramics). Therefore, it would have been obvious, to one having ordinary skill in the art, at the time of invention, to join together any combination of these types of substrates, since the invention of Rostoker is taught to be applicable to all.

Conclusion

The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

US 5,410,807	Bross et al.,
US 5,468,995	Higgins, III,
US 5,959,355	Petit,
US 6,204,455	Gilleo et al.,
US 6,310,301	Heinrich et al.,
US 6,337,445	Abbott et al..

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Jeremy Norris whose telephone number is 703-306-5737. The examiner can normally be reached on Mon.-Th., 9AM - 6:30 PM and alt. Fri. 9AM-5:30PM.

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If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, David L. Talbott can be reached on 703-305-9883. The fax phone numbers for the organization where this application or proceeding is assigned are 703-305-7724 for regular communications and 703-305-7724 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is 703-308-0956.

JCSN
May 19, 2002


KAMAND CUNEO
PRIMARY EXAMINER